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90-314

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of the Commission's	)	GEN Docket No. ~~90-314~~
Rules to Establish New Personal	)	
Communications Services	)	

COMMENTS OF MOTOROLA, INC.

Motorola, Inc. (hereinafter Motorola) submits the following comments in support of its participation in the FCC's panel discussions on personal communications services to be held on April 11th and 12th.

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I. INTRODUCTION AND SUMMARY

Over the past four years, the FCC has witnessed an incredible flurry of interest and development in an evolving family of wireless communications services now known as Personal Communications Services ("PCS"). In large part, the birth of this new industry is the direct result of strong FCC and industry leadership. Given the complexity of the technical, economic and social issues associated with PCS, the Commission has created a workable regulatory framework in record time. The stage has been set for the next generation of wireless services. It is now time to finalize decisions and to move PCS from concept to reality.

Much work already has been accomplished. However, still more is necessary before the vision of low cost, anytime and anywhere communications will be realized. By building upon its earlier decisions in the PCS and Emerging Technologies proceedings, the FCC can resolve the remaining issues in an expeditious manner so that consumers can begin reaping the benefits of PCS.

Commission decisions have a significant impact on Motorola's ability to provide our customers with high quality wireless systems. In assessing the various positions raised in reconsideration, Motorola recognizes that few, if any of the issues have absolute answers. As an experienced manufacturer serving the broad market for a variety of wireless products on a global basis, Motorola views the various reconsideration positions in terms of tradeoffs rather than absolutes. Properly weighing these tradeoffs is determined in large part by the Commission's and industry's overall goals for PCS and for companion global services delivered by satellite.

The Commission's proposal and subsequent decision identified four public policy goals for PCS: 1) competition in delivery of services; 2) speed of deployment; 3) university of services; and 4) diversity of services. Relatedly, the U.S. has also taken public policy positions supporting spectrum at 2 GHz for mobile satellite services. For example, at WARC-92 the U.S. led the international community in identifying spectrum in the 1.8/2.2 GHz bands appropriate for future MSS services.

In consideration of these public policy positions, on balance Motorola urges the Commission to strengthen its initial decision on PCS standards, harmonize its domestic and international U.S. positions with respect to 2 GHz mobile satellite services, and consider the complexity of initiating competitive services in encumbered spectrum when deciding on the appropriate sized license blocks.

As discussed in Section V of these comments, Motorola also supports the allocation of spectrum for unlicensed PCS to provide consumers additional options for low-power on-site communications. To this end, Motorola recommends that the Commission adopt a 1.25 MHz channeling plan for the isochronous (primarily voice) services to provide fair user access and increased spectrum efficiency and concurs with the Commission's decision to split the least congested portion of the band equally between unlicensed voice and data devices.

Finally, Motorola urges the Commission to keep in mind that the PCS allocation provides no relief for public safety, public service and large industrial users that need spectrum to implement privately owned and operated wireless emerging technology

systems suited to their unique requirements. Therefore, companion actions will be necessary to allocate spectrum for these operations.[1]

II. COMMON AIR INTERFACE STANDARDS ARE NECESSARY BEFORE THE PCS VISION CAN BE REALIZED

Motorola believes that one of the most critical components necessary for the success of PCS is the industry conformance to common air interface standards. Therefore, to promote increased competition and lower costs for PCS users, Motorola recommends that the Commission require equipment used for public PCS services to comply with standards developed by an ANSI accredited standards organization. Requiring conformance to such standards will help ensure that the multiple objectives of universality, rapid deployment, diversity of service and competitive delivery are balanced to the maximum extent possible. Furthermore, standards for PCS equipment will enhance the ability of the United States communications industry to export its products, services and expertise to increasingly global markets, creating jobs in the process.

As demonstrated by the success of cellular radio, one single standard would be the ideal approach for PCS if interoperability and ubiquitous service were the only concerns. However, it is clear that several air interface standards will be required to support the diversity of PCS services envisioned by the Commission, the industry and

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[1] Motorola notes the filing of a petition for rule making on December 23, 1993, by the Coalition of Private Users of Emerging Multimedia Technologies ("COPE") that seeks a spectrum allocation for private, not-for-profit emerging technology systems. Motorola supports the goals of this petition and urges expeditious action by the Commission.

consumers. On the other hand, without required standards, PCS users will suffer from a lack of interoperability and roaming and PCS operators would be deprived of the economic benefits of volume manufacturing.

As a global supplier, Motorola supports a number of technologies for the U.S. PCS market. These include CDMA, GSM based PCS 1800, Bellcore based WACS, upbanded U.S. digital cellular and others. Motorola is therefore actively working in the Joint Technical Committee ("JTC") of the Telecommunications Industry Association ("TIA") and Committee T1 to develop U.S. PCS standards for ANSI approval.

In its Second Report and Order in this proceeding, the FCC promoted an unprecedented level of diversity for PCS services. Not requiring standards could jeopardize the achievement of the expected public interest gains from wireless communications. Incompatible equipment and networks could quickly lead to islands of service and frustrated consumers who have invested in equipment which cannot access or exploit the available wireless networks. The lack of officially endorsed standards could severely hamper PCS operators in terms of providing interoperability and roaming services and will reduce any cost advantages inherent to volume manufacturing.

Conversely, officially adopted standards significantly increase the export potential of equipment in the global market. Approximately 70 percent of the world's cellular subscribers use systems based on the U.S. generated Advanced Mobile Phone System (AMPS) standard or its derivatives. Without a regulatory endorsement,

however, technology paths deployed in one country are often viewed by other country's regulatory bodies as renegade, or unworthy of being granted "standards" status.

Ubiquitous PCS services can be advanced without excessive FCC intrusion into the standards process. As the Commission is aware, the JTC, T1 and TIA are working diligently on this task to develop PCS standards by the end of 1994. In conjunction with these industry activities, Motorola believes a Commission requirement to conform to industry developed standards will ensure that standards organizations complete their work on a timely basis.

Therefore, Motorola strongly recommends that the FCC:

- direct ANSI accredited industry standards bodies such as TIA and T1 to adopt interim PCS equipment standards; and
- require PCS equipment authorization requests to certify compliance with interim industry standards developed by ANSI accredited standards bodies.

This approach would ensure a higher degree of interoperability and compatibility through compliance with industry developed standards and promote competition, lower costs and roaming service. Further, the need to ensure the adoption of standards while preventing delays to the commencement of PCS services to the public would be affirmatively addressed by FCC requirements. In summary, this course of action poses no risk of delaying actual PCS implementation and offers great gains for the industry, the public and the country.

III. THE FCC MUST HARMONIZE ITS GOALS FOR PCS WITH THE SPECTRUM NEEDS OF THE MOBILE SATELLITE SERVICE

By allocating the 2130-2150/2180-2200 MHz bands for terrestrial PCS services, the Commission has effectively cut by two-thirds the spectrum identified at WARC-92 on a global basis for mobile satellite service, i.e., only 20 MHz (10 MHz up and 10 MHz down) of the 60 MHz identified at WARC-92 for global development of MSS systems will remain available in the U.S. Motorola is certainly aware of the complexities faced by the Commission in developing a fair and equitable bandplan providing sufficient spectrum for PCS services. However, while Motorola supports allocation of sufficient spectrum for terrestrial PCS services, a global allocation of only 10 MHz in each direction simply is insufficient to meet the mobile satellite spectrum requirements supported by the United States at WARC-92.

MSS is an important member of the generic family of personal communications services. Coverage that would be provided by global LEO satellite systems such as Motorola's proposed Iridium™ system will provide a layer of universality that cannot be matched by terrestrial PCS or by geosynchronous satellite systems. Because the global MSS spectrum allocations in the 1.6/2.4 GHz bands are barely sufficient to satisfy the initial short-term spectrum requirements of global LEO satellite systems, the availability of 2 GHz spectrum is essential to the future success of MSS and to universal access to wireless services. Indeed, the United States delegation, including representatives from the FCC, fought hard at WARC-92 to provide the option for additional mobile satellite service (MSS) allocations. As a result of this

U.S.leadership, the 1980-2010/2170-2200 MHz bands were identified for MSS use on a global basis with the 1970-1980/2160-2170 MHz bands also available for MSS use in Region II.

To foreclose use of a substantial amount of MSS spectrum leaves the U.S. mobile satellite industry with insufficient spectrum, sends conflicting messages to other countries, and undermines U.S. credibility. In this regard, Motorola is particularly concerned that this situation could seriously impact the ability of the U.S. to obtain additional spectrum at future international conferences, not only for MSS but for all services. Therefore, we urge the Commission to resolve the PCS allocation in a way that does not impinge upon the WARC-92 MSS allocations and to initiate a proceeding to allocate 2 GHz band spectrum for mobile satellite services.

IV. FACTORS AFFECTING PCS SERVICE INITIATION

In its original comments in this proceeding, Motorola took the position that 40 MHz license blocks are appropriate to foster the Commission's goal of establishing new competitive wireless providers, given the difficulty of establishing PCS in an encumbered microwave environment. Quite simply, Motorola's reasoning was that 40 MHz license blocks would provide PCS licensees with increased flexibility to co-exist with incumbent microwave systems and initiate service while the negotiation and relocation processes moved forward. Motorola also recommended the allocation of 10 MHz license blocks that could be targeted toward increasing the diversity of services offered consumers. These blocks were envisioned for localized low powered licensed

service offerings that would require less clearing of microwave facilities before service could be initiated.

Over the past months, the Commission has received a massive amount of information supporting alternatives of either 40 MHz or 20 MHz license blocks. From Motorola's perspective as a PCS system manufacturer, neither 20 MHz nor 40 MHz blocks are absolute solutions to the channelization issue. Rather, as with most difficult decisions, determining the appropriate license block size involves tradeoffs. In its Second Report and Order, the Commission recognized this fact by adopting a combination of license blocks sizes ranging from 10 to 30 MHz, with provisions for aggregation up to 40 MHz.

Unfortunately, it appears that any Commission action on PCS channel size will not alter the basic fact that, largely due to incumbent microwave users, the initiation of PCS service will be a complex, time consuming and expensive process. Recent Commission actions in the Emerging Technologies proceeding regarding the grandfathering of incumbent microwave licensees may prove helpful and should ease somewhat the burden of initiating PCS service. Even so, the incumbent microwave environment poses significant hurdles for the PCS industry.

In this regard, in its Second Report and Order, the Commission noted that its adopted channelization plan maintained "the predominant channel separation used by existing fixed microwave operations" and that this fact should "facilitate coordination" between PCS operators and fixed microwave services in support of eventual relocation

of the microwave facilities.[2] While the Rules establish a normal channel plan of 80 MHz pairing for microwave systems in the 1850-1990 MHz band, Motorola's recent analysis indicates that the environment is actually more complex.

As shown in the attached chart, only 50 to 60 percent of the microwave links in the heavily congested microwave areas of Houston, New Orleans and San Francisco are paired at the standard 80 MHz separation. Nationwide, only approximately 75 percent of all microwave facilities in the 1850-1990 MHz band adhere to the 80 MHz separation.[3]

In addition, other factors will work to complicate further the coordination process. For example, microwave receivers in the 1850-1990 MHz band generally operate with a bandwidth of approximately 18 MHz, even though the transmit channel is 10 MHz wide. Therefore, to prevent interference, PCS operators will need to consider the potential impact on adjacent channel microwave systems as well as co-channel links. Also, about 10 percent of all microwave links in the 1850-1990 MHz band operate on interstitial or "offset" channels. Such facilities will often occupy spectrum that spans across PCS channels thus requiring relocation negotiations with multiple PCS operators.

For purely subjective purposes, Motorola provides the following chart assigning letter grades -- with "A" being the highest grade and "E" the lowest -- to the various license block sizes being discussed in this proceeding. This analysis is based on

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[2] Second Report and Order, Gen Docket No. 90-314 at ¶56.

[3] Of course, this average includes a number of locations where the microwave service is less congested and, therefore, less of a concern for initial PCS deployment.

Motorola's understanding of the existing microwave environment as well as its knowledge of the likely technologies to be deployed by PCS operators. The grades represent the general functionality of the spectrum blocks involved -- both before and after relocation has occurred.

BLOCK SIZE (MHz)	GRADE BEFORE M/W CLEARING	GRADE AFTER M/W CLEARING
40	B	A
30	C	A
20	D	B
10	E	C

Finally, one additional issue to consider in devising the PCS band plan is that the additional manufacturing cost to provide a unit covering both the 1.8 and 2.2 GHz bands in response to the Commission's original decision is likely to be in the range of 25 percent, a significant premium for consumers. One must also recognize that multi-band operation would be the norm rather than the exception. A system operator could exit the auction process with licenses that cover a combination of 1.8 GHz and 2.2 GHz frequencies. Multi-band subscriber unit operation is therefore an issue of compatibility and roaming both across different operators' systems as well as in different MTA's/BTA's licensed to the same operator.

V. UNLICENSED PCS SERVICES WILL SERVE THE PUBLIC INTEREST

Motorola supports the allocation of spectrum for unlicensed PCS devices. Providing spectrum for the operation of personal communicating devices that can be sold directly to consumers will expedite the public's initiation into the next stage of the Information Age.

Ensuring the success of the unlicensed PCS allocation requires a tremendous amount of pioneering work by the FCC and the manufacturing community. In this regard, Motorola has worked extensively with WINForum to develop an etiquette that provides spectrum sharing for a diverse variety of technologies. The work performed by WINForum is unprecedented and represents the only consensus position on unlicensed PCS technical parameters that has been presented to the Commission.

Likewise, Motorola has participated heavily with the formation of another industry group, UTAM, Inc., the FCC's designated frequency coordinator for unlicensed 2 GHz PCS devices.[4] Facing tremendous obstacles for relocating incumbent microwave users from the unlicensed PCS spectrum, UTAM has thus far distinguished itself as an open forum driven solely by the consensus positions of its board and members companies. Similar in scope to the accomplishments of WINForum, the relocation efforts of UTAM is imperative to the success of the unlicensed PCS services.

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[4] UTAM's role as frequency coordinator is tentative and contingent upon the FCC's acceptance of UTAM's funding and deployment plans.

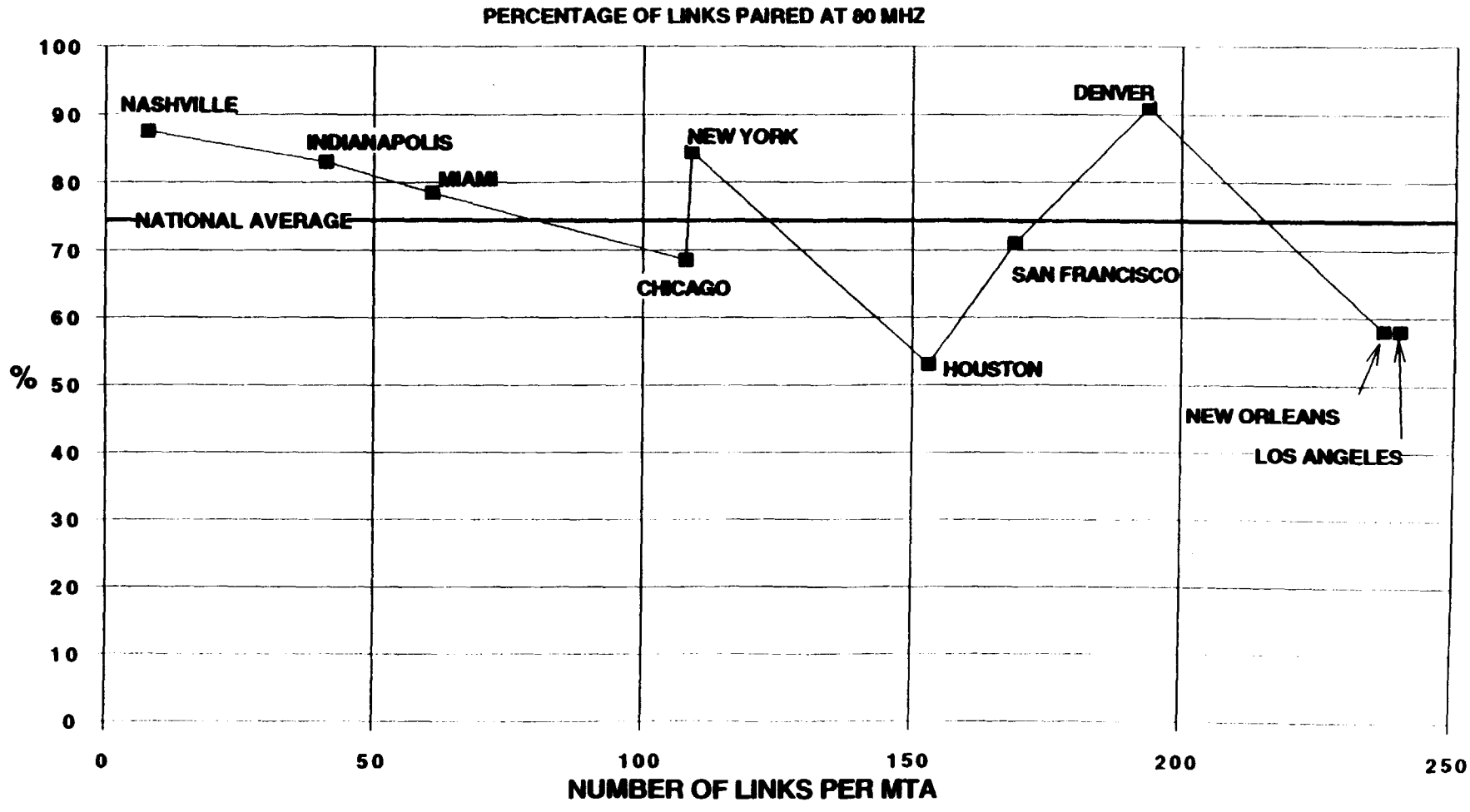
After several years of reviewing the unlicensed PCS issue in an open forum, it is clear that voice system users will have a much greater chance of accessing a channel with 1.25 Mhz channelization. Further, this channelization will support multiple technologies including CDMA based systems. Motorola therefore urges the Commission to channelize the isochronous (primarily voice) unlicensed band in 1.25 MHz increments. Finally, given the particular difficulty of accommodating unlicensed PCS in the existing microwave environment, Motorola encourages the FCC to maintain its decision to split the less congested portion of the band equally between unlicensed voice and data PCS applications.

VI. CONCLUSION

Throughout this rule making proceeding, the FCC has exhibited strong leadership in guiding the industry to the shared goal of anytime, anywhere, cost-effective communications. At this critical juncture, it is imperative that the Commission finalize its Rules so PCS can move from concept to reality. With the proper spectrum environment and technical rules, PCS will flourish into the capable and competitive tool that all expect it to become. In addition, the U.S. must maintain a level of consistency between its action at international conferences and its domestic decisions with regard to 2 GHz mobile satellite spectrum.

MOTOROLA, INC.

MTA FREQ CHART



Attachment